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NEONATAL CEREBELLAR VOLUMES AND CEREBELLAR COGNITIVE AFFECTIVE SYNDROME IN VERY PRETERM CHILDREN AT AGE FIVE YEARS

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Researchers have associated the impact of damage to the cerebellum with cerebellar lesions and lack of cerebellum growth. Studies focusing on adults and older children have identified a symptom cluster known as Cerebellar Cognitive Affective Syndrome (CCAS) to describe the language, executive function, affect and spatial cognition commonly seen with those with cerebellar damage. Although Very Preterm (VPT) children experience higher rates of cognitive and behavioral deficits, few studies have explored the connection between CCAS and prematurity (VPT, < 32 weeks gestational age). The current study aims to identify whether VPT children experience greater rates of CCAS than their Full Term counterparts at age five years. Additionally, this study examines the extent to which total cerebellar volume and the contributions of the left and right cerebellar volumes contribute to the CCAS deficits in VPT children.

VPT children underwent neonatal MRI scanning at term-equivalent age and cerebellar volumes were calculated using the Morphologically Adaptive Neonatal Tissue Segmentation. Both Full Term and VPT children underwent CELF-P2 and WPPSI-III Performance scales to evaluate language skills and spatial cognition respectively at age five years. Parents completed the SRS-2 and BRIEF-P scales to provide information on affect and executive function. A principal component analysis was completed to assign each subject a CCAS composite score.

While VPT children had significantly poorer scores on the individual components, there was not a significant difference in CCAS composite scores between VPT and Full term children at age five ($p = .08$). We found that the CCAS composite scores were significantly related to the total cerebellar volume data ($p = .04$). Total cerebellar volume and SRS-II score for Restricted and Repetitive Behaviors was significantly related ($p = .03$). The study suggests that the development of CCAS symptoms at age five years, specifically those of Autistic behaviors, is related to preterm cerebellar volumes.